A.I.A. File No. 16-D

Peelle Hangar Doors nearing completion in the TWA jet transport maintenance hangar at New York International Airport

PEELLE *Hangar Doors*

THE PEELLE COMPANY, 47 Stewart Avenue, Brooklyn 37, N. Y.

A.I.A. File No. 16-D

TWA JETLINER SERVICE HANGAR, NEW YORK INTERNATIONAL AIRPORT

ENGINEERS: AMMANN & WHITNEY • GENERAL CONTRACTORS: GROVE, SHEPHERD, WILSON & KRUGE, INC.

Hangar Doors for the Huge New Jet Planes Pose Many Engineering Problems

Large individually designed doors of all kinds have long been a Peelle specialty. For this reason, it is natural that The Peelle Company has been repeatedly called in to work on hangar door problems since the early beginnings of the aviation industry. This type of work led to a great deal of experience in the motorization of doors and the transmission of power in the most practical and efficient manner to assure quick easy opening and closing with trouble-free performance under all sorts of conditions.

While Peelle has applied many types of motorized operation to hangar doors, the illustrations on these pages cover only three of them as applied to horizontal sliding doors. They are: (1) The individual leaf operator. (2) The multiple leaf operator in the lead or center panel. (3) The multiple leaf operator mounted in the door pocket driving by chain to lead or center panel. In the second and third operator arrangements an interrope system transmits motivating power to the remaining door leaves.

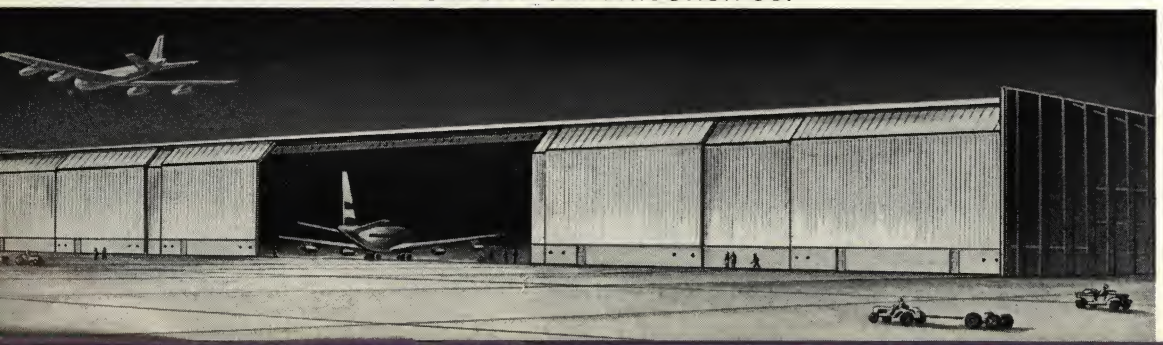
The motorization of huge doors like these, however, is only part of the problem. Such doors require engineering that goes far beyond the simple matter of filling openings. The basic problem is to integrate the doors with the structure for functional efficiency. This entails the construction of hangars designed to support door loads and to allow space for the door and its controls.

For this reason, those who are directly concerned with the design of hangars find that it is extremely advantageous to call in The Peelle Company at the *beginning* of the planning stage. This enables the Peelle engineering department to work along with the designers to produce the most satisfactory doors that can be engineered into the main structure before it is too late to adapt the design of the hangar to accommodate the doors.

The computation of wind loads, the selection of materials and the structural excellence of hangar doors are all matters that receive careful consideration by the Peelle engineering department.

Inquiries are invited from architects and engineers who are planning the construction of aviation hangars. Peelle engineering offers a wealth of practical know-how and the resourceful solution of problems. Peelle hangar door engineering is of the greatest value to those who utilize it before plans on the main structure are too far advanced.

PAN AMERICAN HANGAR AT THE NEW YORK INTERNATIONAL AIRPORT
ARCHITECT: CHESTER L. CHURCHILL • ENGINEERS: AMMANN & WHITNEY
GENERAL CONTRACTORS: CORBETTA CONSTRUCTION CO.



At left is the Pan American World Airways jetliner maintenance hangar, Hangar #14, New York International Airport. This hangar has a cantilever roof design and door panel arrangement similar to the TWA Hangar #12 described above, except the hangar openings are 639'-6" long, by 52'-2⅜" high. Each hangar is equipped with eight door panels operating individually on a pair of parallel tracks.

ARCHITECTURAL COORDINATION BY PORT OF NEW YORK AUTHORITY

TWA jetliner service hangar, Hangar #12, New York International Airport, is illustrated above. This building consists of two hangars with a cantilever roof construction producing an opening size of 819'-2" long x 48'-8½" high. Inasmuch as the hangar roof is of a cantilever design with a total upward and downward deflection of 30" due to changes in temperatures and loads, the hangar access doors were designed with vertical panels and inclined panels to compensate for this deflection. The twelve doors to each hangar opening are arranged to operate in groups of three with an operator in each panel.

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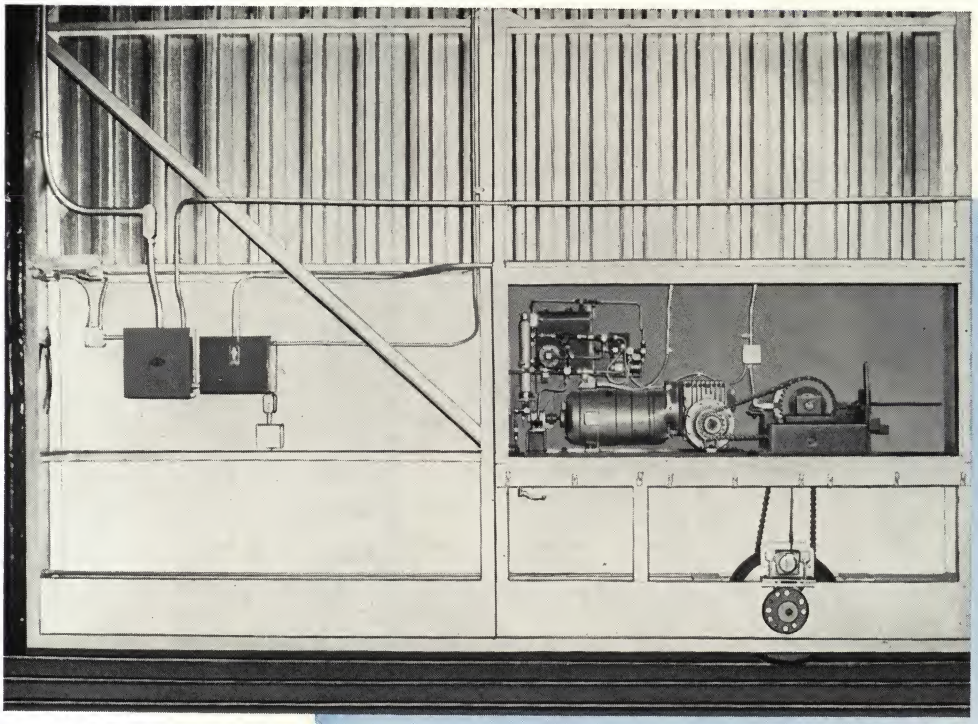


STRUCTURAL DETAILS OF TWA HANGAR DOORS

Photograph at left shows a partial interior elevation of the hangar access doors. The door panels were constructed of structural steel channel framing in convenient sizes for shipment and assembly at the job site. The lower seven feet of the door panel exterior covering is a twelve-gauge flat steel sheet with the balance of the vertical facing on the door panels, fluted aluminum siding on the TWA hangar and fluted galvanized steel on the Pan American hangar on opposite page. This facing material is easily varied to suit the individual preferences of architects or owners.

The photograph shows the bottom support wheel equipped with a floating brake disk with a hydraulically operated spot brake. The stopping distance of the door panel is determined upon the pressure applied to the brake, which is easily adjusted to increase or shorten the brake-stopping distance. This driven wheel is motivated by the integral motor, fluid coupling, gear reduction unit through an intermediate jack shaft assembly. This assembly is designed to permit disengagement of the motor drive so as to facilitate operation of the doors by either a crank handle operator or a tow bar, in the event of power failure. The jack shaft assembly is also equipped with a torque-limiting device to control the amount of tractive force applied to the wheels in the event of an obstruction in the path of the door.

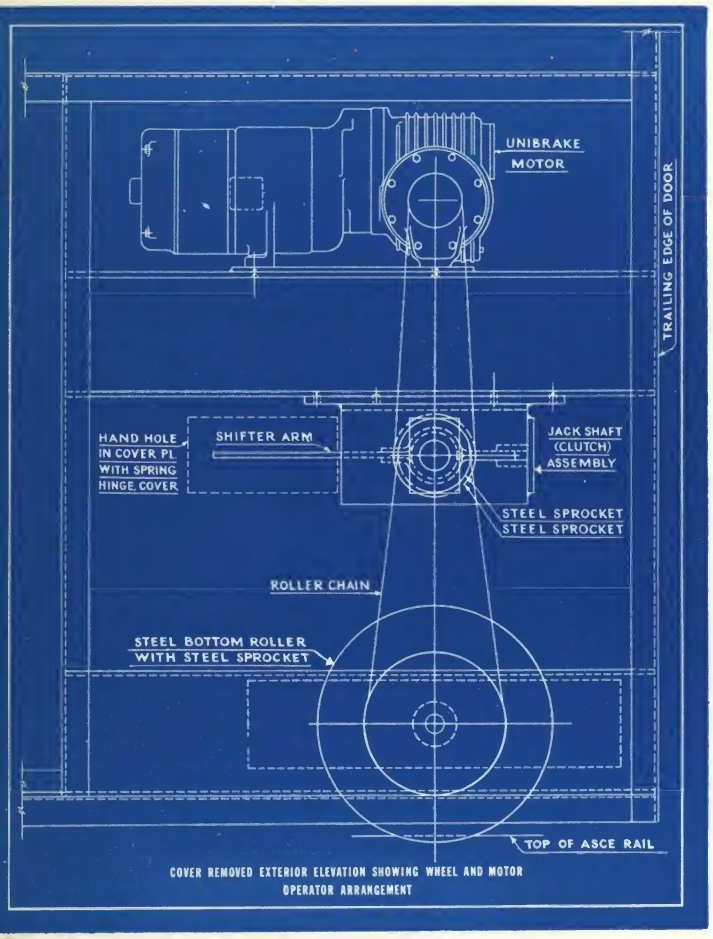
Pressure in the hydraulic system is obtained by the pump attached to the high speed shaft of the motor with all auxiliary hydraulic equipment necessary to make a complete installation and the pressure maintained by an accumulator.

All electric controls are mounted on the door panel and receive their power supply from a fixed overhead, copper bars and sliding trolley.

To the left of the photograph is shown a leading edge of the door panel equipped with a soft, sensitized leading edge arranged to stop the door if it should come in contact with an obstruction.

The adjacent architectural rendition depicts the hangar door installation at the Aviation Trades High School in Queens, New York City, showing a scheme of center parting doors with the tractive power brought to the center leaves and transmitted to the adjacent leaves by a set of interconnecting cables, arranged to start all panels moving simultaneously and arriving in their fully opened or closed position at the same instant.

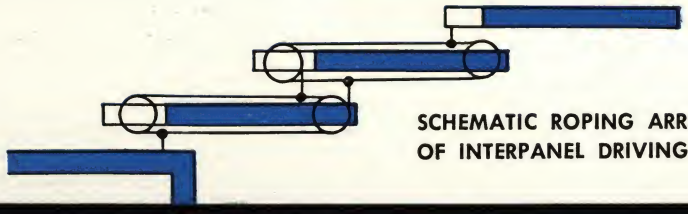
AVIATION TRADES HIGH SCHOOL HANGAR, QUEENS, N. Y.
ARCHITECTS: CHAPMAN, EVANS, DELAHANTY



COVER REMOVED EXTERIOR ELEVATION SHOWING WHEEL AND MOTOR OPERATOR ARRANGEMENT

SCHEMATIC DRAWING SHOWING OPERATION OF AVIATION TRADES HIGH SCHOOL HANGAR DOORS

Drawing at left shows a traction drive operator with an integral motor brake and gear head unit driving a jack shaft assembly which drives the leading wheel of the center panel by means of the chain and sprocket arrangement. This jack shaft assembly is equipped with means for manual operation by tractor. As in the photograph on the previous page, all electrical controls are mounted within the panel and the power brought to the panel in a similar fashion. An alternate method of power operation would be to re-rope the driving chain to provide power to both wheels of the center panel, thus doubling the tractive effect of the doors.



SCHEMATIC ROPING ARRANGEMENT OF INTERPANEL DRIVING CABLES

PARTIAL LIST OF RECENT PEELLE HANGAR DOOR INSTALLATIONS

U.S. AIR FORCE
Bradley Field, Windsor Lock, Conn.

C. A. A. CENTER
Will Rogers Airport, Okla. City, Okla.

U. S. A. F. BASE
Minot, North Dakota

GREATER ROCKFORD AIRPORT AUTHORITY
Rockford, Ill.

AVIATION TRADES HIGH SCHOOL
Long Island City, N. Y.

GEORGE M. BREWSTER & SONS
Teterboro, New Jersey

U. S. A. F. ELLSWORTH A. F. BASE
Elder, South Dakota

WIEN ALASKA AIRLINES
Fairbanks, Alaska

U. S. N. MAINTENANCE HANGAR
Forest Sherman Field, Pensacola, Florida

U. S. A. SUFFOLK COUNTY, A. F. B.
Westhampton, L. I., N. Y.

HANGAR #7 (LOCKHEED)
New York International Airport

BROOME COUNTY AIRPORT
Mt. Ellric, New York

U. S. N. AIR STATION
Memphis, Tenn.

U. S. N. AIR STATION
Willow Grove, Penna.

U. S. A. AIRPLANE HANGAR
Fort Sill, Okla.

U. S. A. F.
Lowry Field, Denver, Colo.

DOUGLAS AIRCRAFT COMPANY
Tulsa, Okla.

U. S. A. F.
Scott Field, Belleville, Ill.

U. S. N. AIR STATION
Buckley Field, Denver, Colo.

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